Division of Agricultural Sciences
UNIVERSITY OF CALIFORNIA

TRENDS AND OUTLOOK

California CHERRY INDUSTRY

JERRY FOYTIK

CALIFORNIA AGRICULTURAL
Experiment Station
Extension Service

CIRCULAR 501

CALIFORNIA'S PLACE IN THE CHERRY INDUSTRY

Production

of sweet cherries in California reached an all-time high of 33,500 tons annually in 1945–49 and then decreased by one-quarter to 25,000 tons in 1955–60. The state's share has remained at about 30 to 35 per cent of the nation's crop during the past several decades.

Acreage

expanded rapidly until the mid-1930's. California now has 10,400 bearing acres (down 30 per cent from the 1937 peak) and 3,800 non-bearing acres. Over three-quarters of this acreage is located in two counties: San Joaquin and Santa Clara.

Yield

per acre remained at about 1.6 tons in California until the early 1940's and then rose sharply to 2.9 tons in 1945–60. Average yield has varied widely from year to year.

Fresh Sales

take 45 per cent of the California crop. Two-thirds of this total is shipped to out-of-state markets. California accounts for 35 per cent of the sweet cherries sold fresh in the United States and markets its supply, because of earlier maturity, before cherry shipments from other areas become heavy.

Processing

of sweet cherries was limited to canning until 1924, when commercial brining to produce maraschino cherries was introduced. Now many more sweet cherries are brined than canned in California, and this is also the situation in other states. California accounts for 25 per cent of all sweet cherries brined and 35 per cent of those canned in the United States.

Foreign Trade

in sweet cherries is small. Imports of brined cherries amount to about 6 per cent of the United States pack. Exports take 3 per cent of the United States canned pack and only 1 per cent of the fresh shipments.

Domestic Use

reached a peak in 1945–49. Per capita consumption of California fresh and processed cherries was one-third lower in 1955–60.

Farm Prices

rose sharply since the early 1930's, mainly because of improved general economic conditions. They vary greatly from year to year because of large annual fluctuations in yield. In California the farm price is 20 per cent lower for cannery cherries and 35 per cent lower for brining cherries than for cherries sold fresh.

The Outlook

is for increased production in California mainly because acreage is expanding. The present upward trend in farm prices may be stopped for the next few years unless consumer purchasing power increases more rapidly than it has recently.

JERRY FOYTIK

CALIFORNIA CHERRY INDUSTRY

TRENDS AND OUTLOOK

CONTENTS

The Industry
California's position 4
Growing conditions 6
Producing areas 6
Varieties planted 6
Harvesting 7

Acreage
Past trends 8
Location 8
Varietal composition 9
Age distribution 10
Future acreage 12

Yield
Past changes 14
Comparative yields 15
Future yields 15

Production and Utilization
Production trends 16
Future production 16
Crop utilization 17
Exports and imports 19
Domestic use 20

Processing Uses
Canning 23
Brining 23

Fresh Consumption
Sales pattern 25
Out-of-state shipments 25
Auction marketings 27
Auction prices 30

Grower Returns
General level 31
Returns by outlets 32
Future returns 33

California is the leading producer of sweet cherries in the United States—but not by a large margin. The state produces about 30 per cent of the nation's crop, Oregon 25 per cent, Washington 19 per cent, and other states 26 per cent.

Cherries were grown in California during the early part of the nineteenth century: by the Russians at Fort Ross and the Spanish padres at some of their missions. Commercial production remained small, however, until the 1850's when varieties were introduced from eastern nurseries. By 1859 plantings had increased to an estimated 105,000 trees—the equivalent of some 3,000 acres, or about 20 per cent of the 1959 acreage. Further expansion of the industry was delayed until shipping methods to eastern markets were developed. The first carload of cherries was shipped East by fast freight in 1885, and reportedly sold for $1 per pound.

Throughout the past 50 years about half of the California crop sold fresh and half was processed. However, the distribution of fresh sales changed markedly during this period: shipments to out-of-state markets increased from one-half to two-thirds of fresh marketings. Brining, which began commercially in 1924, expanded rapidly to about one-third the crop since 1935. Canning declined correspondingly—from 50 to 20 per cent of all sales.

California's fresh cherries, because they mature early, are marketed before supplies of other fruits and of cherries

SOUR CHERRIES AND SWEET CHERRIES

Two groups of cherries, sour and sweet, are produced commercially in the United States. They are grown in different sections of the country and are used in different ways.

Sour cherries, also called pie or tart cherries (*Prunus cerasus*) are grown mainly in five states of the Great Lakes region (Wisconsin, Michigan, Ohio, Pennsylvania, and New York). Six western states (Oregon, Washington, Idaho, Montana, Utah, and Colorado) account for 8 per cent of the crop. Almost the entire crop is canned or frozen; only 6 per cent is sold fresh and 1 per cent is brined.

Sweet cherries (*Prunus avium*) are grown chiefly in the three Pacific Coast states. The other four western states (Idaho, Montana, Utah, and Colorado) account for 8 per cent of the crop, and the Great Lakes region for 18 per cent. About 40 per cent of the crop is sold fresh, 40 per cent is brined, and 20 per cent is canned.

Almost exactly 60 per cent of the average crop (219,000 tons) for 1950–59 was sour cherries and 40 per cent sweet cherries.

Sweet cherries represent the vast bulk of all cherries brined (97 per cent) and of those sold fresh (83 per cent). They are much less important in other outlets—canned, 20 per cent, and frozen, 1 per cent.

from other states become heavy. Cherries constitute one-quarter of the fresh deciduous tree fruits shipped from California during May 1–June 15. California ships 80 to 85 per cent of its cherries by mid-June while other states ship only 10 per cent of their crop during that time.

The situation is different, however, for processed cherries. Although California packs its supply earlier, canned and brined cherries processed in this state are sold in direct competition with those packed in other states.

This circular examines the factors responsible for past changes and estimates future prospects. It may help cherry farmers, processors, and marketers in their planning by projecting for the future various factors that will affect the profitability of cherry production in California.

THE INDUSTRY

The United States, with approximately one quarter of the world production, is the leading producer of cherries. In this country cherries are grown extensively in 12 states, and to some extent in several other states where the fruits are used on the farms or sold on local markets.

California's Position

No sour cherries are produced commercially in California. The state produces 30 per cent of the nation's sweet cherry crop.

Table 1 shows how California utilizes its crop in comparison to other states. In each of the three Pacific Coast states about 20 to 25 per cent of the production is canned. The relative importance of

THE AUTHOR: Jerry Foytik is Associate Professor of Agricultural Economics and Associate Agricultural Economist in the Agricultural Experiment Station and on the Giannini Foundation.

AUGUST, 1961

Table 1. U. S. Sweet Cherry Production and Utilization, 1950–59 Average

Use	California	Oregon	Washington	Other	U.S. total	Calif. as % of U.S.
	Tons, fresh use					
Shipped fresh	11,920	3,280	10,080	8,380	33,660	35.4
Brined	8,680	11,760	2,000	11,520	33,960	25.6
Canned*	5,640	5,110	3,350	2,300	16,400	34.4
Total sales	26,240	20,150	15,430	22,200	84,020	31.2
Farm use	300	1,480	760	1,320	3,860	7.8
Not utilized	0	0	420	140	560	0
Total crop	26,540	21,630	16,610	23,660	88,440	30.0
Per cent of sales						
Shipped fresh	45.4	16.3	65.3	37.7	40.1	
Brined	33.1	58.4	13.0	51.9	40.4	
Canned	21.5	25.3	21.7	10.4	19.5	

* Includes small quantities frozen.
Note: See box on last page for source of data appearing in all tables and charts shown in this circular.

brining and fresh sales, however, varies widely by state. In Oregon fresh shipments represent 16 per cent of sales and brining 58 per cent. Almost two-thirds of Washington's sales are shipped fresh and only 13 per cent is brined. California has an intermediate position—45 per cent is shipped fresh and 33 per cent is brined.

CHERRY PRODUCTION DISTRICTS

Counties for each production district are listed in descending order of present acreage:

Stockton District includes San Joaquin and Stanislaus counties and constitutes 52 per cent of the state's total acreage.

Santa Clara District includes five counties to the southeast of San Francisco: Santa Clara, Alameda, Santa Cruz, Monterey, and San Benito. About 33 per cent of the state's cherry acreage is located in these counties.

North Bay District includes Sonoma and Napa counties and represents 3 per cent of the acreage.

Other Areas, representing 12 per cent of the acreage, include all of the 49 remaining counties of California. Twenty-three of these have no commercial acreage, seventeen have limited plantings of less than 30 acres each and nine have acreage ranging from 35 to 430.

Growing Conditions

Cherries are very sensitive to soil and climatic conditions. Generally, best results are obtained on light, well-drained, loamy soils. Most areas of the Central Valley are not well adapted to the cherry because temperatures are high and humidities low. An exception is San Joaquin County which is the most important cherry-producing area of the state.

The rain falling during the growing season in most areas does not provide enough moisture for vigorous tree growth. Most cherry orchards are irrigated. The number of applications varies from a single irrigation to as many as six. The number of irrigations necessary and the amount of water to be applied is influenced by rainfall, climate, and soil of the area.

Sweet cherry varieties will not produce crops when self-pollinated. In addition, some are cross-unfruitful—that is, interbarren with each other. Hence, securing proper pollination is essential. Care must be exercised to select profitable varieties which are interfruitful and bloom at the same time. Other cultural practices such as fertilization, weed control, disease and insect control, require attention as they do for all fruits.

Producing Areas

Climate, cultural requirements, and economic factors have limited commercial production in California largely to a few specialized areas where cherries can be grown most profitably. Conditions in other fruit-growing areas of the state are less favorable. These relative advantages are reflected in plantings made in former years and more recently. However, cherries are now going into some areas which appear to be less favorable, including older areas where trees were removed. The trees being planted are virus free (not available in earlier years) and of newer varieties. It is too early to know whether these newly-planted areas will remain in production or even will expand.

As production became more commercialized, growing areas became more sharply defined. For example, 35 counties had plantings of at least 20 acres each in 1919 compared to 22 counties in 1960. During this 40-year period acreage tripled (from 3,560 to 11,220 acres) in the two leading counties and declined sharply (6,840 to 3,010 acres) in the other counties.

Over three-fourths of the present acreage is located in two counties: San Joaquin and Santa Clara. By adding nearby counties with smaller acreage to these production centers we arrive at the principal cherry-producing districts listed in the box. The two main cherry areas represent five-sixths of the present acreage—52 per cent in the Stockton District and 33 per cent in the Santa Clara District. North Bay is established as a separate district because Sonoma County is the third county in Royal Ann acreage and was the leading county until the early 1940's.

Varieties Planted

Although numerous varieties have been and can be grown in California, only a few are of commercial importance now. About 90 per cent of the present acreage is in three varieties: 53 per cent is planted to Bing, 28 per cent to Royal Ann, 9 per cent to Black Tartarian. A total of 7 per cent of the acreage is planted to Lambert, Chapman, Republican, and Burbank. Other varieties represent only 3 per cent.

The seven varieties named differ, sometimes markedly, in appearance, maturity dates, eating quality, suitability for processing, tree growth, and other respects—see box. Such differences influence the marketability and profitability of different varieties and should be included among the factors considered when you choose varieties you wish to grow.

Harvesting

When harvesting begins in a particular orchard depends on the intended outlet for the crop. Different stages of maturity are desired for fresh shipment and processing. Usually the grower knows in advance the outlet for his fruit and picks accordingly. The picking season for his orchard is lengthened because trees are picked two and even three times and several varieties are grown.

Care is taken in picking the fruit. Cherries for fresh shipment must have the stems attached, otherwise the skin is broken and the fruit spoils quickly. Processing cherries are normally also picked with stems attached.

CHERRY VARIETIES IN CALIFORNIA

The seven varieties are listed in order of approximate ripening dates.

Chapman, the earliest, is a sweet, tender-fleshed, black cherry. The fruit is of only medium size and fair quality, which helps explain the large acreage decrease for this variety.

Burbank is a sweet, tender-fleshed, dark red, early cherry of medium size. It has lost consumer favor because of flesh softness, size and quality. Burbank yields less and cracks more during rainy periods than Chapman. The trees are susceptible to virus attacks.

Black Tartarian is a tart-flavored, tender-fleshed, black cherry of fairly large size. It accounts for most of the cherries marketed fresh before Bing moves in volume. In some years the fruit produced is quite soft and of small size.

Bing, the most important variety grown in California, is a sweet, firm, black cherry of large size and excellent quality. It is shipped fresh in large volume and is used also for canning and brining. In some years the trees tend to produce double fruits. Bing experienced a sharp acreage increase during the 1950's.

Royal Ann is a large, firm, juicy cherry of good quality. It is light-colored (yellow with a red blush) whereas the other six varieties are dark red to black. Almost the entire crop is canned or brined. The trees are very productive but produce many doubles and are susceptible to virus. Also the fruit cracks badly during seasons of even light rains. Royal Ann is known as Napoleon in all parts of the world except the Pacific Coast.

Republican is a sweet, very firm, roundish, black cherry, generally of small size. It ships well but its principal use at present is brining. The trees are very productive.

Lambert, the latest-ripening of these varieties, is a sweet, firm, dark red to black cherry of very large size. It ships well and is considered by many people to be the best flavored cherry grown commercially in California. Generally this variety escapes damage from cracking because the fruit matures after the rainy season. If rains come late, however, the fruit cracks badly, as do other cherries.

Cherries to be shipped fresh to eastern markets are harvested at or near the minimum maturity requirements specified by the California Fresh Fruit and Vegetable Standardization Act—see the Agricultural Code. Somewhat more mature cherries are shipped to nearby markets and to processing plants since less ripening will occur during transport.

Two benefits result from delaying harvest as long as it is possible economically after minimum maturity requirements are met. Quality develops better in cherries picked at the later stage of maturity; and yields are raised since fruit size and total tonnage increase rapidly from minimum maturity to tree-ripened fruit.

The reason why less-mature cherries are shipped east lies in the fact that the wholesale trade in the East prefers the bright red fruit, even though quality is poorer, and generally pays a higher price for it. In consequence, growers harvest their cherries at or near minimum maturity. They should determine for themselves whether their returns might be increased, because of greater yields, by shipping more mature fruit, even though it sells at a lower price.

ACREAGE

Location, varietal composition, and age distribution of cherry acreage have changed considerably in the past. Current trends indicate future changes.

Past Trends

In 1919 California had 3,000 acres of nonbearing cherry trees. Nonbearing acreage reached a peak of 5,800 in 1926 and then declined to 920 in 1945–46. Heavy plantings during recent years increased the total to 3,800 in 1960.

Bearing acreage doubled from 7,400 in 1919 to a peak of 14,900 in 1937, a decade after the peak in nonbearing acreage. It then decreased by over one-third to a level of 9,400 maintained during 1950–57. In 1960 bearing acreage was 10,400.

Total acreage reached a peak of 18,000 in 1932—75 per cent above 1919—and then decreased, more or less steadily, to an average of 11,800 in 1948–54. The subsequent increase in nonbearing acreage raised total acreage to 14,200 in 1960, which is 20 per cent below the 1932 peak.

Location

Although bearing acreage was the same in 1960 as in 1926, its location had changed substantially. Bearing acreage more than tripled (from 1,600 to 5,210 acres) in the Stockton District and increased 30 per cent in the Santa Clara District. It declined 70 per cent for the remainder of the state.

As a result, the relative importance of the districts changed drastically. The proportion of the state's bearing acreage in the Stockton District increased sharply since 1921—from 13 to 50 per cent. Santa Clara dipped from 33 per cent in 1921 to 24 per cent in 1931–36 and then increased to 35 per cent in 1959. For the balance of the state bearing acreage decreased from 54 per cent of the total in 1921 to 15 per cent in 1960.

Figure 1 shows this shift for the period 1921–59. The top panel indicates the district composition of the state's bearing acreage. The bottom panel gives the percentage located within each district.

Furthermore, commercial acreage within each district has become more concentrated in its principal county. Since the 1920's the relative importance of San Joaquin County increased from 94 to 99 per cent of the Stockton District's acreage. Santa Clara County increased from 65 to 87 per cent of the five-county acreage in Santa Clara District. Sonoma County increased, in relative importance, from 71 to 90 per cent of the acreage in North Bay District.

About 57 per cent of the present acreage in "Other Areas" is in four counties adjacent to the Central Valley: Contra Costa, Solano, Sacramento, and Sutter.

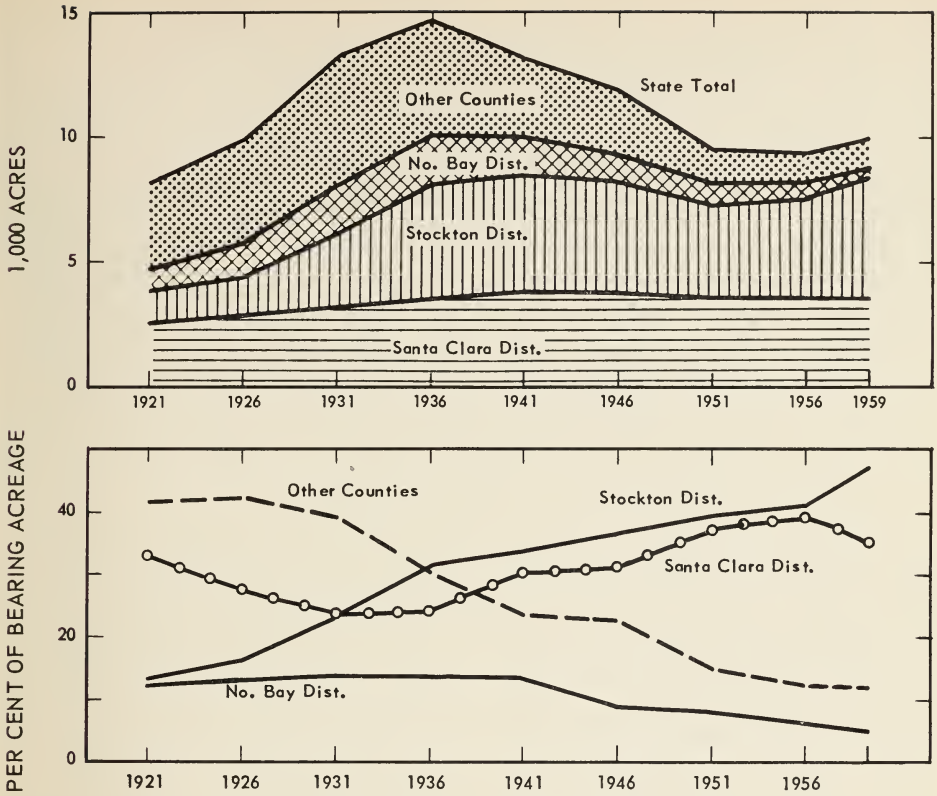


FIG. 1. CALIFORNIA CHERRIES: DISTRIBUTION OF BEARING ACREAGE, BY MAJOR DISTRICTS, 1921–1959.

Another 15 per cent is in Riverside. The remainder (28 per cent) is scattered among 21 counties.

Varietal Composition

Cherry acreage has changed sharply in its varietal composition since 1936, the first year for which acreage data were reported on a varietal basis. Between 1936 and 1960, total acreage increased 70 per cent for Bing and decreased 23 per cent for Royal Ann, 38 per cent for Lambert, and 66 per cent for other varieties. In relative importance Bing increased from 27 to 53 per cent of the total, while Royal Ann decreased from 31 to 28 per cent and Black Tartarian from 19 to 9 per cent. Other varieties declined from 23 to 10 per cent: 5.4 to 3.9 for Lambert, 5.2 to 1.3 for Republican, 3.9 to 1.4 for Chapman, and 8.6 to 3.4 for other minor varieties.

This shift was accomplished mainly by removing trees of unwanted varieties and planting new orchards to desired varieties. A variety is "unwanted" or "desired" for several reasons, technological and economic. For example, each variety produces fruit of a typical size, firmness, flavor, and eating quality. However, the consumer's willingness to pay more for one variety than another, because of differences in such characteristics, is an economic factor. Each variety typically produces a certain tonnage per acre depending on, among other things, tree age and climatic conditions. Its yield is increased or decreased by changing the amount and type of cultural care given the trees. Economic and technological considerations

Table 2. Acreage of California Cherries, 1936 and 1956

Variety	State total		Stockton		Santa Clara		Other areas	
	1936	1956	1936	1956	1936	1956	1936	1956
Bing	4,460	5,740	1,680	2,980	1,070	1,990	1,710	770
Royal Ann	5,170	4,080	1,200	1,380	1,560	2,000	2,410	700
Black Tartarian	3,240	1,410	900	620	1,010	550	1,330	240
Republican	880	200	110	30	330	160	440	10
Chapman	650	260	140	140	30	0	480	120
Lambert	900	490	300	310	180	60	420	120
Other	1,430	720	150	250	320	210	960	260
Total	16,730	12,900	4,480	5,710	4,500	4,970	7,750	2,220

will determine how much money the grower wants to spend for orchard care. These illustrations serve to indicate that numerous factors are, or at least should be, considered when the grower decides which varieties to remove and which to plant. The net effect of the expected influences of these economic and technological factors determines whether a given variety is unwanted or is desired at a particular time.

Suburban growth in areas such as the Santa Clara Valley also has affected the varietal composition of cherry acreage. Large amounts of former orchard land have been converted to residential and industrial use during the past decade or so. Orchards of cherries and other fruits were uprooted as growers could not afford to turn down the high prices offered by subdividers and manufacturers. Tree removal was determined by orchard location rather than varietal considerations. This means, of course, that desired as well as unwanted varieties were removed.

Table 2, which summarizes varietal acreage by district for 1936–56, shows that there were some differences in varietal changes among districts. In the Stockton District Bing increased from 40 to 52 per cent of total acreage, Royal Ann decreased slightly (from 27 to 24 per cent), Black Tartarian declined one-half, and minor varieties continued at about 13 per cent. In the Santa Clara District, on the other hand, Bing increased more sharply (from 24 to 40 per cent), Royal Ann increased (from 35 to 40 per cent), while both Black Tartarian and minor varieties decreased by about one-half in relative importance.

Age Distribution

The most noticeable change in the age composition of cherry trees over the years is the fluctuation of nonbearing acreage relative to total acreage. This proportion remained high for many years, reached a peak of 37 per cent in 1924–26, declined sharply to 7 per cent in 1943–46, and then increased again to 30 per cent in 1957–60 as new plantings were made.

The reason why nonbearing acreage varied so widely can be found in an explanation of changes in new acreage. Cherry trees planted and standing the following year averaged 160 acres per year in the low period of 1936–46, and rose to 340 in 1947–53, and 780 in 1954–58. These data are not available for earlier years, but plantings must have been heavy until almost 1930 since nonbearing acreage reached a peak in 1926 and did not decline much during the next few years.

Table 3. Older Bearing Acreage* of California Cherries, 1936, 1951 & 1960

Variety	1936	1951	1960
	Per cent of total bearing acreage		
Royal Ann	60	85	59
Bing	36	77	44
Black Tartarian	50	88	74
Republican	57	89	82
Chapman	44	74	83
Lambert	41	87	67
Other	47	80	62
All	49.2	82.2	54.9

* Trees 17 years and older.

These changes in new plantings were due chiefly to economic causes. During the first quarter or so of this century demand for fruits was rising and, as a result, plantings exceeded tree removals for cherries as they did for other fruits. When prices dropped steeply in 1930–32 and continued relatively low for another decade, new plantings declined sharply. They continued low for other reasons during and immediately after World War II. The large acreage planted since 1950 was needed to maintain bearing acreage—10,374 in 1960 compared to 9,416 ten years earlier. The inroads of subdivisions and industries around San Jose forced growers to seek new areas, if they were to continue producing cherries—areas south of their former orchard lands in Santa Clara County and in the Stockton District.

Almost half (49 per cent) of the bearing acreage in 1936 consisted of trees 17 years or older. This proportion increased to a high of 82 per cent in 1951 largely because so few trees were planted during the 17-year period ending in 1946. In 1951 there were 1,670 acres of younger bearing trees (16 years or less since planting) compared to about 7,300 in 1936. The proportion of older trees (17 years or more) to total bearing acreage declined to 55 per cent in 1960 because new plantings were increased sharply after World War II. These came into bearing as young bearing trees by 1960 (or will come into production during the next few years) in an amount greater than the removal of older trees.

The change during 1936–60 in the proportion of bearing acreage consisting of older bearing trees is shown in table 3 for the main varieties. Between 1936 and 1960 the proportion decreased slightly for Royal Ann—60 to 59 per cent of total bearing acreage. It increased quite sharply for black cherries: from 36 to 44 per cent for Bing; and from 49 to 72 per cent, on the average, for other varieties.

The distribution of cherry acreage among nonbearing, young bearing and older bearing trees in 1936 and in 1956 is compared by districts in figure 2. This distribution changed very little in the Santa Clara District. In the Stockton District and other areas, however, the change was sharp. The proportion decreased for young bearing trees and increased for both nonbearing and older bearing trees. In more detail, the differences among districts are:

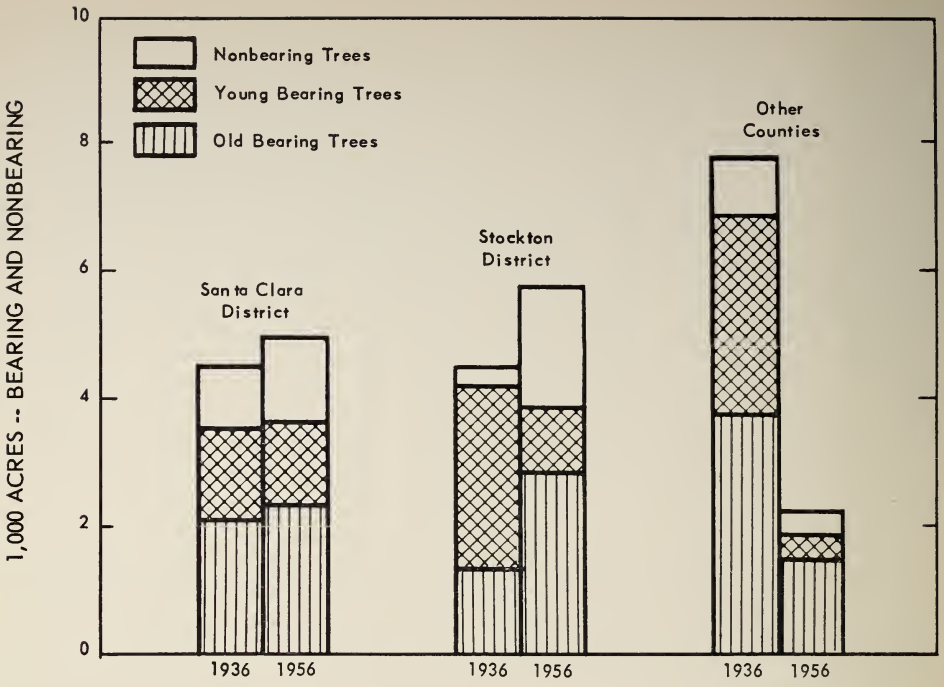


FIG. 2. CALIFORNIA CHERRIES: AGE CLASSIFICATION OF ACREAGE, BY MAJOR DISTRICTS, 1936 AND 1956.

• Nonbearing acreage increased 30 per cent in the Santa Clara District and sixfold in the Stockton District. It decreased 45 per cent in other areas. The Stockton District's proportion of the state total increased from 14 to 52 per cent during 1936–56.

• Acreage in young bearing trees (16 years or less since planting) decreased in each area: 4 per cent in the Santa Clara District, 64 per cent in the Stockton District and 88 per cent in the remainder of the state. The proportion located in the Santa Clara District increased from 19 to 49 per cent of the state total.

• Acreage in older bearing trees (17 years or older) increased slightly (11 per cent) in the Santa Clara District, doubled (increase of 116 per cent) in the Stockton District, and decreased more than 60 per cent elsewhere. The Stockton District's proportion rose from 18 to 43 per cent of the state total.

Future Acreage

Reasonably accurate prediction for the immediate future can be made on the basis of recent plantings still to come into bearing and of probable removal of older, diseased and weakened trees.

Table 4 shows acreage shifted to bearing and acreage removed from production for the period since 1919. An average of about 2,640 acres were removed from production each five years. This amounts to 23.5 per cent of the bearing acreage that existed at the beginning of each period. If this percentage rate is continued, some 2,440 acres will be removed during 1960–64. Since 3,860 acres of presently nonbearing trees will begin to bear, there will be a net gain of 2.150 bearing acres during 1960–65.

Actually, of course, trees may be re-

Table 4. Changes in Bearing Acreage of California Cherries

Period	Bearing acreage				
	Beginning of period	Addition*	Apparent removals		End of period
			Acres†	Per cent‡	
1919–24	7,370	3,040	1,230	16.7	9,180
1924–29	9,180	5,320	2,490	27.1	12,010
1929–34	12,010	5,410	3,100	25.8	14,320
1934–39	14,320	3,150	2,770	19.3	14,700
1939–44	14,700	1,350	3,620	24.6	12,430
1944–49	12,430	860	3,380	27.2	9,910
1949–54	9,910	2,100	2,890	29.2	9,120
1954–59	9,120	2,440	1,620	17.8	9,940
1960–65	10,370	3,860	....	...	.....
5-year average	.....	3,059	2,638	23.5	.....

* Trees of nonbearing age at beginning of five-year period.
† Difference between beginning of bearing acreage plus "addition" (i.e., new bearing acreage) and ending bearing acreage.
‡ Removals as a per cent of beginning bearing acreage.

moved at a different rate. The age distribution data given in table 5 suggests that removals probably will not be heavier than average. The proportion of bearing acreage of trees less than 11 years old is greater than these averages for recent years. At the same time trees 16 years and older represent a smaller proportion.

To cancel out the added bearing acreage from present nonbearing trees, about 40 per cent of the 1960 bearing acreage would have to be removed from production during the next five years. This rate, considerably above that experienced at any time since 1919, seems unlikely to materialize. Therefore, bearing acreage is likely to increase substantially during the early 1960's. It may well be that by 1965 bearing acreage will be at or near 12,000—15 per cent above the present level.

To indicate future acreage changes on a varietal and district basis is more difficult. One might begin by assuming that the rate for removing present bearing trees (23.5 per cent during the next five years) will apply uniformly to all varieties and districts. In that case more of the bearing acreage would be in Bing and in the Stockton District—a trend that has been under way for several dec-

Table 5. Age Distribution of California Cherry Bearing Acreage

Tree age	1945	1950	1955	1960
Years	Per cent of bearing acreage			
10 and under	6.7	7.3	20.4	30.0
11–15	17.9	8.0	6.1	14.2
16–20	23.4	16.4	6.2	4.6
21 and over	52.0	68.3	67.3	51.2

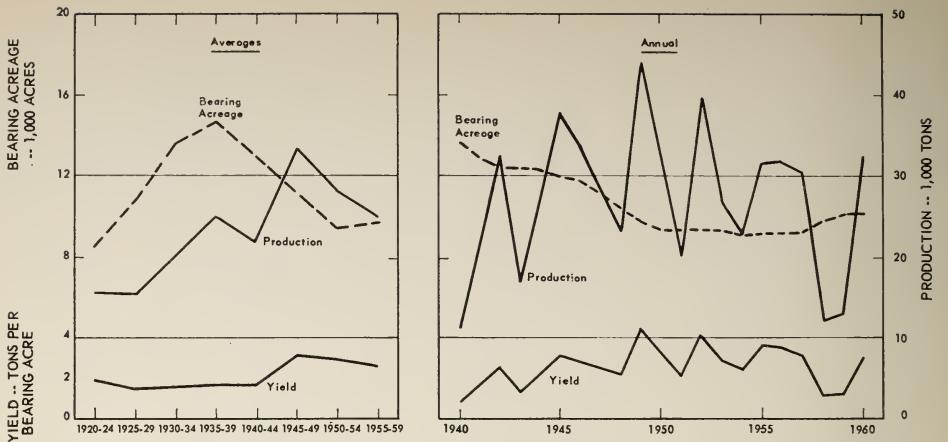


FIG. 3. CALIFORNIA CHERRIES: PRODUCTION, BEARING ACREAGE, AND YIELD, 1920–1960.

ades. Actually, removal rates will vary (because of differences in present age distribution and for other reasons) so that the concentration for relatively more acreage in Bing and in the Stockton District will be even greater.

YIELD

The yield for a given year depends primarily upon the weather conditions during the blooming, growing, and harvesting season. In some years, however, other reasons become important: bird damage, fruit disease at harvest, and the "re-awakening" of a virus which remained dormant for several years. The long-run movement in yield is guided by other forces. Changes in the age, geographic, and varietal composition of the bearing acreage are important. Changes in cultural practices alter yield over the life of the tree as well as for the current year.

Past Changes

Cherry yield varied widely during the past 40 years—from 0.8 tons per bearing acre in 1940 to 4.4 tons in 1949. Figure 3 shows the general movement in average yield since 1920 in the left-hand panel and the annual yield since 1940 in the right-hand panel.

Annual fluctuations averaged 1.0 tons since 1940, or about 37 per cent of the average yield (of 2.6 tons per bearing acre) for the period. The year-to-year change fell below 0.4 tons in seven of the past 20 years, was 0.8 to 1.3 tons in nine, and exceeded 1.6 tons in four.

Such wide variations result in corresponding annual fluctuations in production and hence complicate the problem of marketing cherries. During the past 20 years annual fluctuations averaged 35 per cent of average fresh sales and 50 per cent of average processing sales. Thus variations in yield produce greater year-to-year changes in quantities processed than in fresh shipments.

After the war, yield rose sharply—from a level of 1.6 tons per bearing acre in 1920–44 to 2.9 tons in 1945–60. This change was an abrupt one. The average yield for 1945–60 exceeded the annual yield for each of the 25 previous years, while the yield for only two of the past 16 years fell below the 1920–44 average. Annual yields during these 41 years were distributed as shown in the following tabulation:

Annual yield	1920–44	1945–60
Tons per bearing acre	Number of years with yield indicated	
0.4–0.99	1	0
1.0–1.59	13	2
1.6–2.19	8	1
2.2–2.79	3	4
2.8–3.39	0	5
3.4–3.99	0	2
4.0–4.59	0	2
Total	25	16

Several reasons are responsible for the increase in cherry yields.

Research has developed improved measures for controlling diseases, insects, and weeds, better methods for pruning, thinning, and other cultural practices. These improvements have been adopted by California fruit growers, and many were directly applicable to cherry production.

Since 1945 a much larger proportion of the bearing trees than before was at or near full maturity. This change in age composition raised the average yield.

Other acreage changes, too, tended to increase average yield. Less productive trees were pulled—that is, marginal trees were removed, marginal orchard lands were retired, unwanted varieties were replaced. Many of the new plantings were on lands and in varieties having above-average yield. There were, of course, exceptions to these general long-run tendencies. For example, acreage planted to Republican declined sharply, although the variety produces a heavy crop. Subdivisions took over orchard land regardless of its yield. Prospective yield is only one of several considerations when new producing areas are explored.

Comparative Yields

The yield increase for cherries since World War II was similar to that for other California fruits. In 1945–59 yield was 80 per cent above the 1920–34 average for cherries, compared to increases of 100 per cent for other deciduous tree fruits and 60 per cent for grapes. Over the past 40 years the per-acre yield for cherries has continued at about 40 to 50 per cent of the yield for the other fruits. Since 1920 these yields (tons per bearing acre) increased as follows:

Fruit	1920–34	1935–44	1945–59
Cherries	1.60	1.71	2.87
Other deciduous tree fruits	3.25	4.36	6.48
Grapes	3.78	4.65	6.00

Yields for other deciduous fruits increased for the same basic reasons that apply to cherries. Better cultural practices were developed and introduced. The composition of the bearing acreage changed to include relatively more trees that produce well because of their age, variety, and geographic location.

Only a limited comparison can be made of yields in the several sweet-cherry producing states. The data now available suggest that throughout the period 1925–46 yield in California was some 25 per cent lower than in Washington and slightly higher than in Oregon and other western states. Yields cannot be compared for recent years because acreage data for 1947 and later have not been published by the United States Department of Agriculture.

Future Yields

If trees are removed at about the rates indicated in the section on future acreage on pages 12 and 13, the age distribution of bearing acreage will be changed and, by the mid-1960's, will be about as follows: 30 per cent in trees under 11 years old, 30 per cent in trees 11 to 20 years old, and 40 per cent in older trees. The 1960 distribution was also 30 per cent for trees under 11 years old, but for trees 11 to 20 years old, it was only 19 per cent, while for trees 21 years and older, it was 51 per cent—see table 5. Thus a considerably larger proportion of the bearing trees will not have yet reached full ma-

turity. This change in age composition will tend to lower yield below the present level—but not sharply.

Better cultural practices have already been adopted by cherry growers. They will continue to be used, possibly on an even wider basis, and be improved further. While growers wish to use the best practices known, economic considerations make this not always desirable.

For example, during the years ahead, cherry prices may increase more slowly than grower costs—or even decline. If the price-cost squeeze becomes greater, growers will endeavor, even more than at present, to find ways for reducing production costs. The result may be to develop less expensive cultural practices. It may also mean, however, that growers will reduce the care given trees. Expenditures justified under one price situation may not be justified under another. The simplest illustration is that of picking costs. When fruit prices are high it pays to pick more carefully and thoroughly than when prices are low. The same principle applies to the intensity with which other cultural practices are applied. Of course, such reductions cannot go too far without adversely affecting the entire operation. Even if expenditures for cultural practices are restricted because of depressed prices, the good care that trees have already received will have a beneficial effect, though decreasingly less so, on yields for the immediate future.

These considerations lead to the conclusion that yield may increase, but not by very much during the early 1960's. A sharp rise above the present level is not expected.

Furthermore, yield will continue to vary from year-to-year to about the same extent as it does now. Presumably growers will endeavor to modify cultural practices, insofar as feasible, to reduce these annual fluctuations. But there is no change now known which would achieve this effectively.

PRODUCTION AND UTILIZATION

Estimates of future production are based upon the forecasts of bearing acreage and yield discussed on pages 12 and 15.

Production Trends

The average cherry crop rose sharply from 7,600 tons in 1910–14 to a peak of 33,500 tons in 1945–49 and then declined 20 per cent to a level of 27,000 tons in 1950–60. Figure 3 (page 14) shows how past changes in acreage and yield affected this general course in production.

A rapid expansion in bearing acreage was the main reason for the increase in production until about 1930. During the next 15 years bearing acreage and average yield changed little and hence production remained at an average of 22,400 tons in 1930–44. Production rose by one-half to 33,500 tons in 1945–49, in spite of a 20 per cent decline in bearing acreage, because yield increased sharply—to 3.0 tons compared to 1.6 tons in 1930–44. Since 1950 production has remained at a lower level because both bearing acreage and yield have continued somewhat below the peaks reached in 1945–49.

Production has varied considerably from one year to the next because of large fluctuations in yield. Such short-run changes in production amounted to 10,700 tons, or 39 per cent of the average crop (of 27,100 tons) during the past twenty years. Production changed from one year to the next by 16,000 to 25,000 tons in five years since 1939, by 10,000 to 13,000 tons in eight years, and by 6,000 tons or less in seven years.

Future Production

From information now available we conclude that for the next few years per-acre yield is likely to remain at about the

Table 6. Production and Utilization of California Cherries, 1910–59

Five year average	Production*	Quantities used for:					
		All sales	Fresh marketings			Canning†	Brining
			Total	Out-of-state	Intra-state		
	Tons, fresh weight						
1910–14	7,580	7,250	3,550	1,780	1,770	3,700	0
1915–19	10,240	9,810	4,450	2,260	2,190	5,360	0
1920–24	15,600	15,120	7,640	4,760	2,880	7,440	40
1925–29	15,380	14,930	8,430	5,300	3,130	5,340	1,160
1930–34	20,360	18,920	10,850	6,680	4,170	4,380	3,690
1935–39	25,120	23,290	11,940	6,280	5,660	4,440	6,910
1940–44	21,800	20,300	12,060	6,160	5,900	3,120	5,120
1945–49	33,500	33,200	13,840	8,300	5,540	8,540	10,820
1950–54	28,100	27,800	13,300	8,900	4,400	6,080	8,420
1955–59	25,280	24,980	10,760	7,300	3,460	5,280	8,940

* Difference between production and sales consists of small quantities used directly by the farm household (averaging 430 tons per year until 1933 and 300 tons thereafter) and quantities not utilized in seven years during 1931–43.
† Includes average tonnages frozen: 60 in 1940–44, 1,140 in 1945–49, and 60 in 1950–54.

present average or rise slightly while bearing acreage probably will increase substantially—some 15 per cent by 1965. This means an upward production trend for the early 1960's. Normal crops for the next few years should be about midway between the average for 1950–60 and the 1945–49 peak production. This projection assumes that

- good cultural practices will continue in the major producing areas;
- tree removal will be at or near the average rate prevailing during the past 40 years, so that the age composition of acreage will change in about the manner indicated.

Crop Utilization

Disposition data for the past 50 years are summarized in table 6. The entire crop was not harvested each year. During seven years in the period 1931–43 large quantities remained unharvested. They averaged 13 to 16 per cent of the crop in 1931, 1939, and 1942, 6 to 8 per cent in 1932, 1938, and 1943, and 1.6 per cent in 1933. In all other years (before 1931 and after 1943) the entire production was harvested—except for quantities considered to represent normal cullage.

Practically the entire harvested production goes into commercial channels. Growers retain some cherries for use by their household—for fresh consumption, home-made pies, and possibly some home processing. The quantities used on home farms are estimated by the Crop Reporting Board to have averaged 380 tons (4.3 per cent of the crop) in 1910-19, 470 tons (2.8 per cent) in 1920–33, and 300 tons (1.1 per cent) in 1934–60.

Ordinarily California cherries are not frozen. Substantial quantities were so used in two years: 2,800 tons in 1945 and 2,500 tons in 1946. In six other years (all within the period 1944–52) smaller quantities, ranging from 50 to 300 tons, were frozen. No sales to freezers were reported for years before 1944 or after 1952.

Until the mid-1920's fresh shipments and cannery sales increased at about the

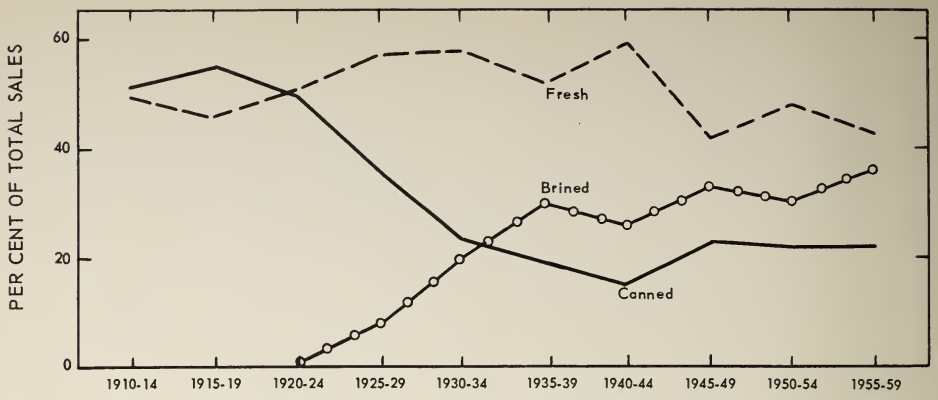


FIG. 4. CALIFORNIA CHERRIES: DISPOSITION OF SALES, 1919–1959.

same rate. As production expanded each of the two major outlets continued to take approximately one-half of the crop. Since about 1930, however, fresh shipments and cannery sales increased much more slowly. In fact, during part of this period the quantity of cherries going to these two outlets declined. This means that most of the increase in production during the past 30 years was brined.

Changes in the relative importance of the three major outlets is shown in figure 4. A new utilization pattern seems to have been established. Since 1945, about 44 per cent of all sales were fresh shipments, 34 per cent for brining, and 22 per cent for canning.

All cherries sold by growers actually leave their farms in fresh form. Fruit going to processors is designated processing sales—or more specifically, cannery sales, brining sales, etc., according to the intended use. Cherries which remain in fresh form until they reach consumers represent fresh marketings—or fresh shipments or fresh sales. Most, but not all, of this fruit is consumed fresh. Some may be used in baking or for home processing. Nevertheless, the entire volume marketed fresh is considered to be fresh sales even though some of these cherries may not be consumed fresh.

Usually these fresh marketings are divided into two main parts. One represents shipments, in fresh form, to markets outside of California, including exports. These out-of-state shipments are destined primarily for markets in the north-eastern states, especially in the heavily-populated industrial region extending from Chicago to New York City.

The remainder of fresh marketings, of course, is sold within California. Thus intrastate fresh sales (also called local fresh sales, or more briefly local sales) refers to cherries sold fresh within the state—i.e., exclusive of processing sales. Thus local sales include purchases made by town people who come to the orchard for their cherries, whether such fruit is used fresh or home processed, but excludes cherries used on farms where grown.

If production increases as much as indicated above, sales will need to expand into each major channel: fresh, canning, and brining.

It is hard, however, to predict the relative increase to be expected in the various outlets. In view of recent utilization trends and probable changes in bearing acreage, the following changes relative to 1950–59 averages are likely to take place:

- Processing sales, especially for brining, may expand more rapidly than fresh shipments.

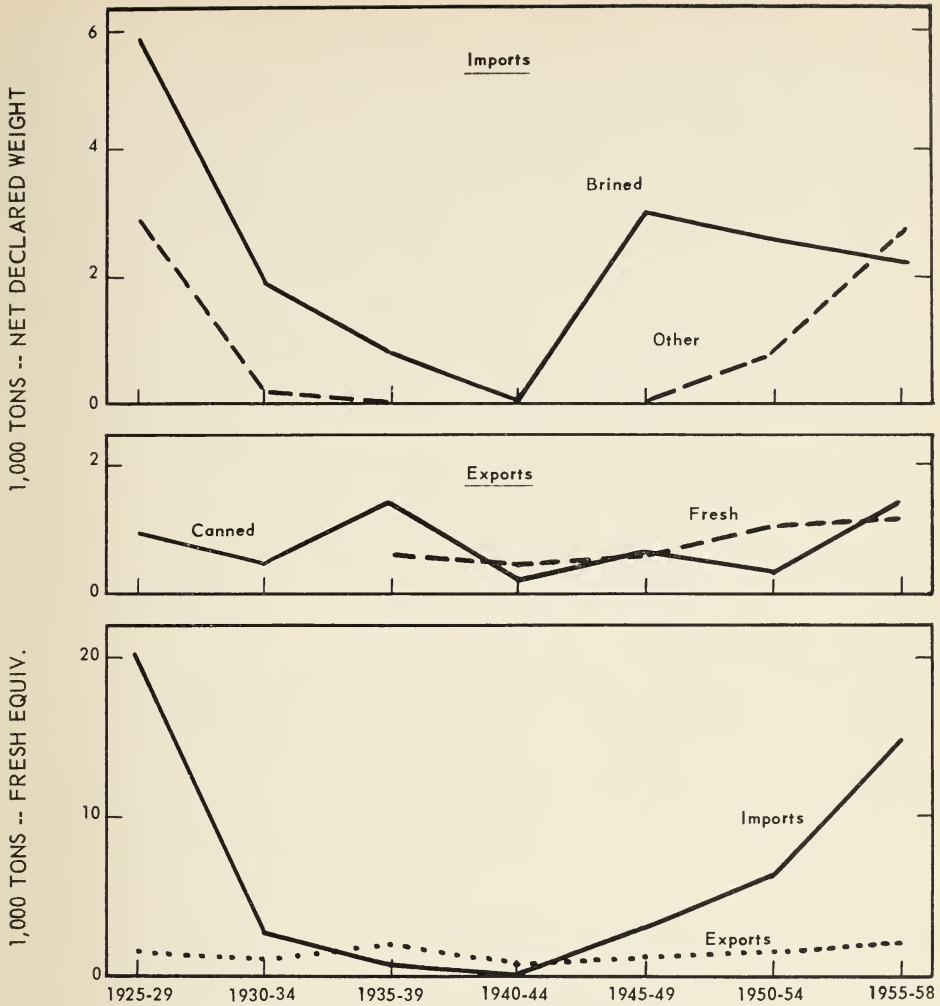


FIG. 5. CHERRIES: U. S. IMPORTS AND EXPORTS, 1925–1958.

- Processing sales may increase more for black cherries than for Royal Ann.
- Fresh sales may increase more at local than at out-of-state markets.

This indication of possible changes in the utilization pattern is merely tentative, based upon the situation as it now exists.

Exports and Imports

United States exports and imports of cherries, for the period since 1925, are shown in figure 5. The data refer to all cherries since government reports make no separation between sweet and sour types. This information needs to be examined to indicate the importance of foreign trade to the California cherry industry.

In recent years (1950–59) about 60 per cent of the total cherry export (on a fresh-fruit weight basis) consisted of fresh cherries and 40 per cent of canned cherries.

Fresh shipments abroad averaged 570 tons in 1935–49 and 1,140 tons in

1950–59. Practically the entire quantity (95 per cent) went to Canada. Canned-cherry exports were about 1,500 tons (net declared weight) in 1955–59, the same as in 1935–39, and compared to 450 tons in 1940–54. Since World War II about half this quantity was shipped to Belgium. The bulk of the rest went to Canada, The Netherlands, and West Germany.

These data indicate that only a small part of the nation's cherry crop is exported—less than 1 per cent since 1950. Before World War II a somewhat higher proportion was exported: 1.5 per cent in 1925–29 and 1.3 per cent in 1935–39.

Imports of brined cherries rose to a peak of 67,600 barrels as an average in 1927–29—equal to about 3.6 times the United States pack. They dropped sharply and remained low during the depression and war period—an average of 3,600 barrels in 1932–45. Since 1950 the average has been about 19,400 barrels, or 7 per cent of the domestic pack. Imports of other processed cherries (dried or preserved) averaged 6,000 tons in 1924–26 (the peak period), only 14 tons in 1932–49, and 2,600 tons in 1955–58.

The small volume of cherries exported and imported is of significance to the California's cherry industry. Exports never were very large. Even if shipments abroad increased several fold, exports would not take an appreciable portion of California's crop. Imports were a major source of our supply of processed cherries other than canned in the 1920's. Since then domestic processing has expanded tremendously so that imports represent only a small part of our consumption. Of course, a further increase in imports during the next few years would hurt cherry growers but it would not be a calamity. For example, if imports of brined cherries doubled by the mid-1960's, the increase (over the 1950–59 average) would be equal to only about 2 to 2.5 per cent of the sweet-cherry crop expected for that time.

Domestic Use

United States consumption of sweet cherries increased until the late 1940's and then declined: by 23 per cent for fresh use and only 2 per cent for processed cherries. Because of continued population growth per-capita consumption followed a somewhat different

Table 7. Domestic Consumption* of Sweet Cherries, U. S., 1935–59

Use	1935–39	1940–44	1945–49	1950–54	1955–59
	Total—1,000 tons (fresh basis)				
Fresh	28.0	35.6	39.6	35.8	30.4
Processed	34.3	35.8	60.6	57.5	59.6
All	62.3	71.4	100.2	93.3	90.0
	Per capita—pounds (fresh basis)				
Fresh	.43	.53	.55	.46	.36
Processed	.55	.53	.84	.73	.70
All	.98	1.06	1.39	1.19	1.06

* Shipments adjusted roughly for foreign trade by subtracting exports (assumed at half of exports for all cherries) and by adding total imports of brined cherries.

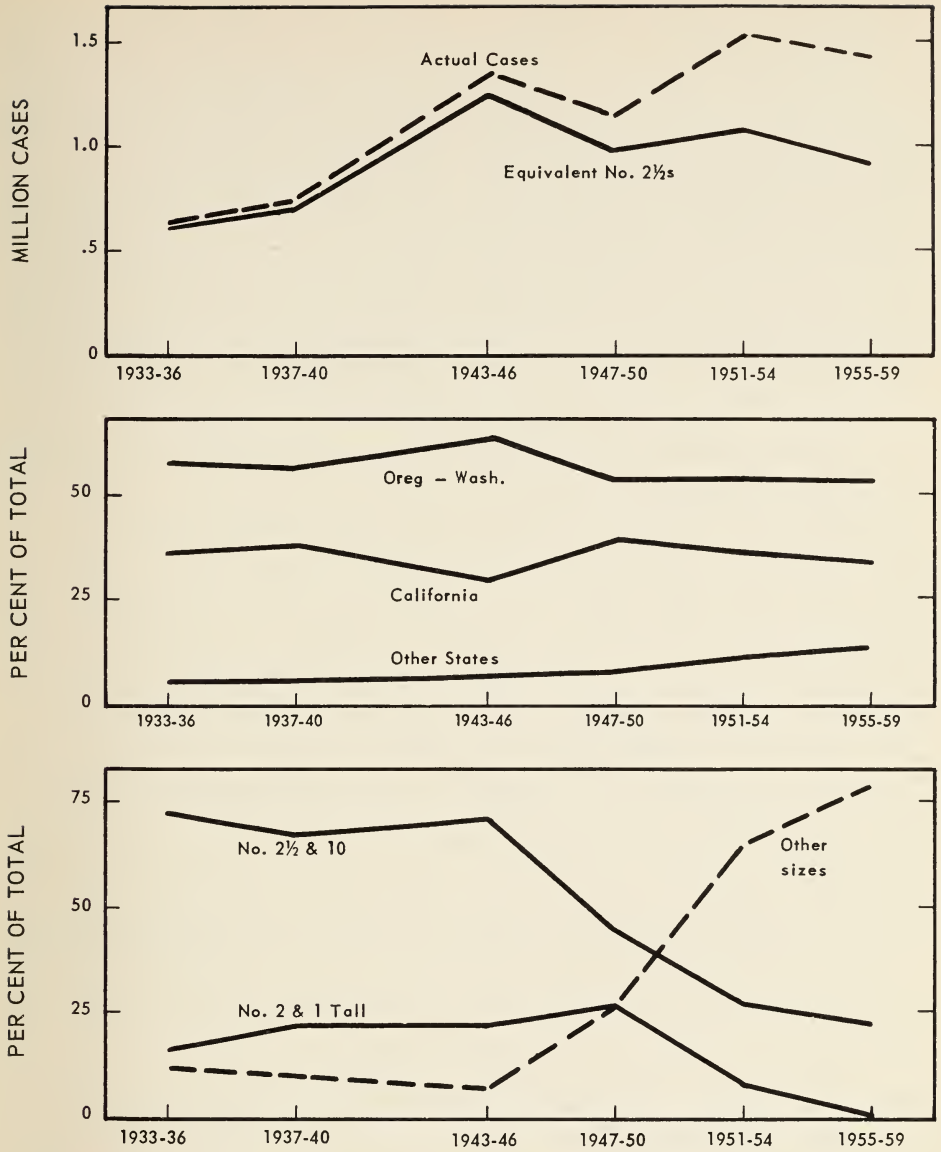


FIG. 6. CANNED SWEET CHERRIES: COMPOSITION OF U. S. PACK, 1933–1959.

course. The increase to 1945–49 was less and the subsequent decrease was greater. In fact, per-capita consumption in 1955–59 was 24 per cent below the 1945–49 average and only slightly above the 1935–39 average—1.6 pounds in 1955–59, compared to 0.98 pounds 20 years earlier.

This information, presented in more detail in table 7, applies to all sweet cherries produced in the United States, of which California cherry growers produce and market almost one-third. The present downward trend in per-capita consumption will confront them with a difficult problem if, as is expected, production is increased in the next few years—possibly at a rate greater than population growth.

PROCESSING USES

The proportion of the California crop going to processors has remained relatively constant, at about 50 per cent, during the past 50 years. Relative quantities used in different processing outlets changed markedly in the manner discussed above on page 17. Figures 6 and 7 show the volume of canned and brined cherries packed in California and in other states since the early 1930's.

Before about 1940, California cherry processing was limited chiefly to the Royal Ann variety. After World War II increasing quantities of black cherries, mostly Bing, have been processed, especially as brined cherries.

Generally, less than 30,000 cases of black cherries have been canned annually in California, except in three years (1946, 1949, and 1952), when a much larger quantity was packed—averaging an annual pack of 125,000 cases (actual) compared to 650,000 cases of Royal Ann.

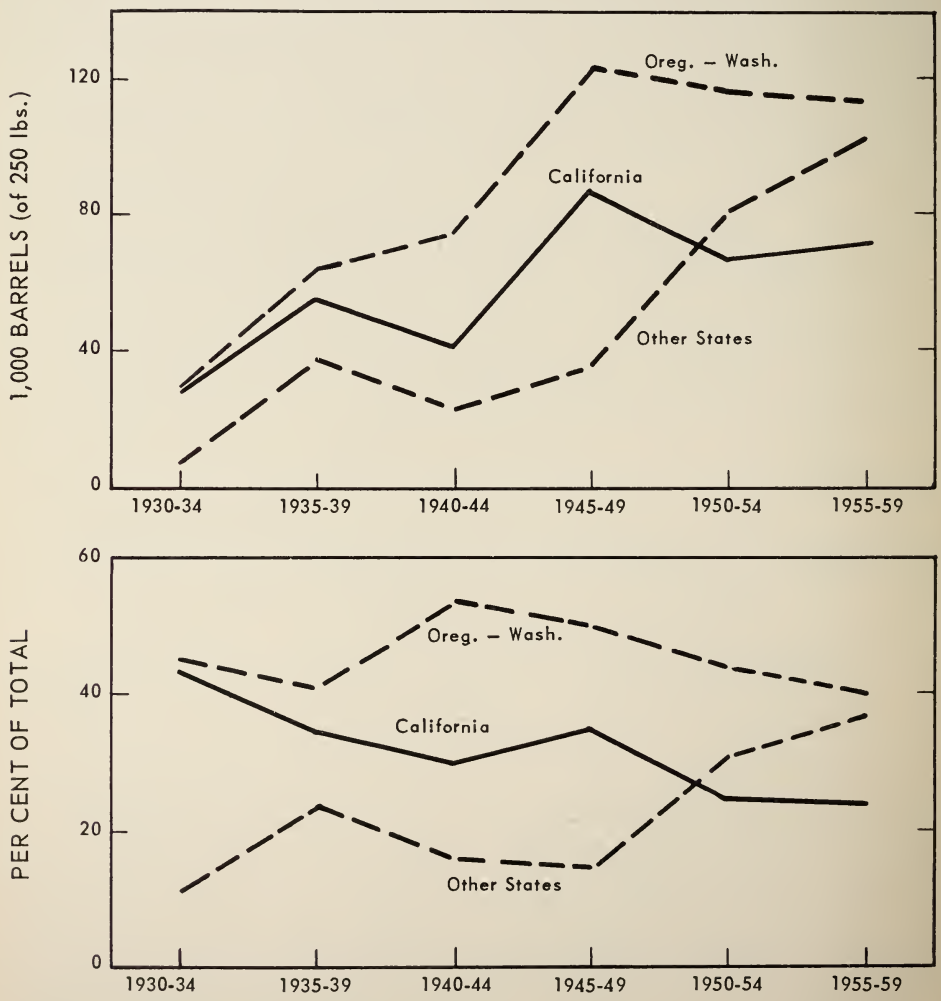


FIG. 7. BRINED CHERRIES: COMPOSITION OF U. S. PRODUCTION, 1930–1959.

Canning

California's pack of canned sweet cherries increased to 265,000 cases (basis of 24 No. 2½ cans) in 1930–39. It reached a peak of 460,000 cases in 1945–49 (when the average crop was large) and then levelled at an average pack of about 350,000 cases since 1950.

The pack varies greatly from year to year. These annual variations averaged 195,000 cases since 1940, or almost 60 per cent of the average pack. The annual change exceeded 250,000 cases in eight of the past 20 years, was 120,000 to 200,000 cases in five, and fell below 100,000 cases in seven.

Sweet cherries are also canned in other states, especially Oregon and Washington. These two states account for most of the black cherries canned in the United States.

The nation's pack of sweet cherries is just about 1.0 million cases. This level, maintained since 1947, is considerably below the peak of 1.9 million cases packed in 1946. Year-to-year changes in the total pack are large—40 per cent of the average pack.

California's pack has averaged 35 per cent of the United States total during the past 30 years. This proportion, however, varied greatly from year to year depending upon the relative crop of sweet cherries produced in the different states. It exceeded 45 per cent in about one out of five seasons and fell below 20 per cent with the same frequency.

The shift toward greater use of smaller can sizes following World War II is is shown in the bottom panel of figure 6. Between 1933–40 and 1955–59 the pack in No. 303, 300 and 8 oz. cans rose sharply from 11 to 77 per cent of the total. No. 2 and 1 Tall cans dropped from 20 per cent to practically nothing, while No. 10 and 2½ cans decreased from 69 to 23 per cent.

Brining

Since the introduction of commercial brining in 1924, the California pack rose to a peak of 86,000 barrels in 1945–49 and then declined somewhat to an average of 70,000 since 1950. Until about 1940 practically the entire pack was processed from Royal Ann cherries. Black cherries, such as Bing, have been used in increasing volume during the past 20 years. Since 1952 they represent over 40 per cent of the cherries brined in California.

The pack of brined cherries expanded less rapidly in California than in other states—see figure 7. Hence, California's share has declined more or less steadily from 43 per cent of the U. S. total in 1930–34 to 24 per cent in 1955–59.

Table 8. Comparison of Quantities of Brined Cherries Packed and Used for Canning

Brined cherries	1930–39	1940–49	1950–54	1955–59
	1,000 barrels			
Packed in U.S.	112.1	192.2	265.1	298.0
Packed in California	41.9	63.9	67.4	71.2
Used for canning in California*	17.8	44.4	55.3	72.4

* The data shown above as quantities used for canning (fruit cocktail and fruit salad) are estimates since this information is not published. These estimates assume that 1.5 and 1.65 pounds of brined cherries are used per case (24 No. 2½) for fruit cocktail and fruit salad, respectively. They were developed from two factors. The brined cherries used by canners must be stemmed, pitted and halved. A yield of about 55 to 60 per cent appears reasonable. Federal grades specify that cherries shall constitute 2 to 6 per cent "by weight of the drained fruit" of total ingredients for fruit cocktail and 3 to 7 per cent for fruit salad. Generally canners tend to go toward the lower ends of these ranges since cherries are the most expensive ingredients in the mixed fruit.

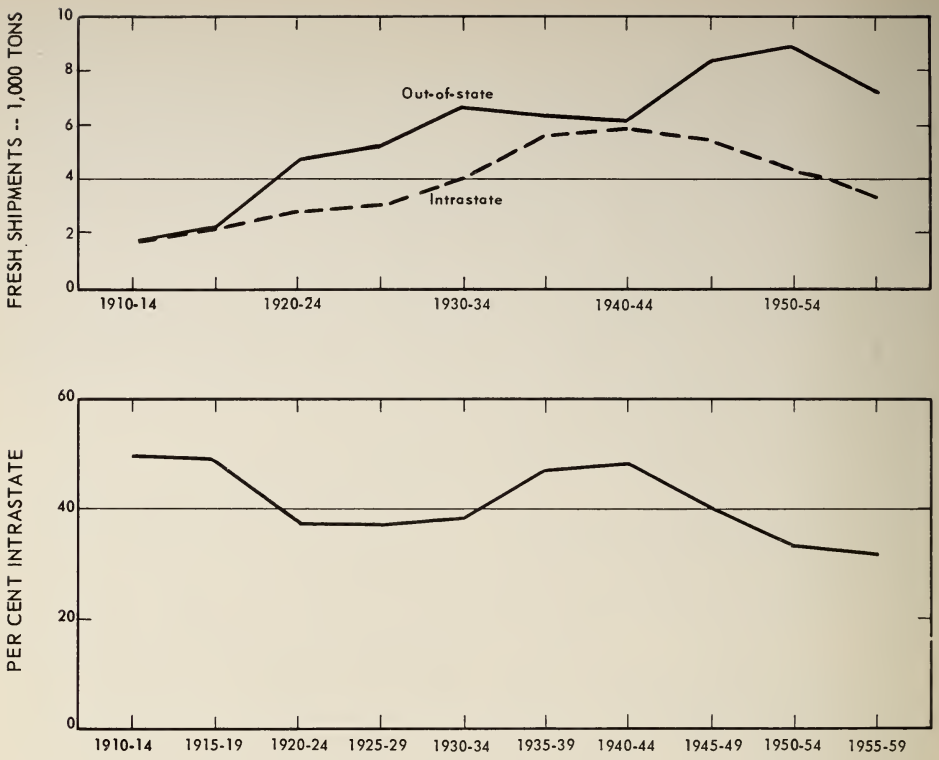


FIG. 8. CALIFORNIA CHERRIES: OUT-OF-STATE AND INTRASTATE FRESH SHIPMENTS, 1910–1959.

Brined cherries are used in several different ways. Some are used in candy, ice cream, and bakery products. Some are processed further and sold as maraschino cherries. California canners require large quantities in their packs of canned fruit cocktail and fruit salad. The importance of this outlet for brined cherries is indicated in table 8.

Canners' use of brined cherries increased, of course, as their packs of canned fruit cocktail and fruit salad expanded. Their use of brined cherries was equal to 42 per cent of the California pack in 1930–39, 76 per cent in 1940–54, and 102 per cent in 1955–59. Of course, all of the brined cherries used by canners were not packed in California. Some were shipped in from Oregon and Washington.

This upward trend in the use of brined cherries by canners is of considerable importance to the California cherry industry. The pack of fruit cocktail and fruit salad has been increasing and is expected to continue to increase. This means a further expansion in the major outlet for California brined cherries—the channel which takes one-third of the state's production.

FRESH CONSUMPTION

Fresh shipments increased rapidly to 13,800 tons per year in 1945–49 and remained at about this level during 1950–57. Sales were much lower (an average of only 5,800 tons) in 1958 and 1959 when very small crops were produced—an average of only 12,500 tons compared to 30,000 tons in 1950–57.

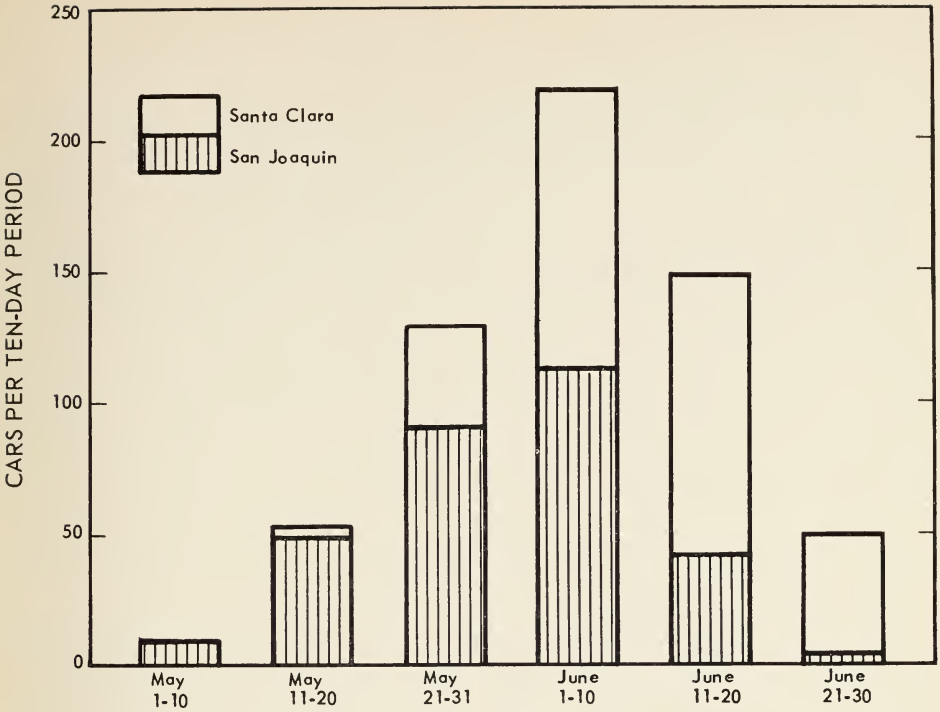


Fig. 9. California Cherries: Out-of-State Rail Passings, by County, Ten-day Periods, 1955–1959 Average.

Sales Pattern

Figure 8 shows the volume of fresh marketings during the past 50 years. Local fresh sales rose fairly steadily from 1,800 tons in 1910–14 to an average of 5,700 tons maintained during 1935–49 and then declined to below 4,400 tons in 1950–57. Out-of-state shipments changed somewhat differently. They increased more rapidly until about 1930, remained at an average of 6,400 tons during 1930–44, and then rose to a higher level of 8,800 tons in 1945–57.

The proportion of fresh marketings sold within California declined from about one-half of the total in 1910–19 to one-third in 1950–59. This shift occurred while population grew much more rapidly in California than elsewhere in the nation and while production of sweet cherries in other states increased. The net effect was a sharp decline in per-capita consumption of fresh sweet cherries in California and an even sharper increase in the rest of the country. Average consumption is still higher, by about 50 per cent, in California. It would be reasonable to expect local sales to expand as much as out-of-state shipments, or even more rapidly, during the next few years.

The balance of this section deals with information on out-of-state marketings. Comparable data on local sales are not available.

Out-of-State Shipments

Half of the interstate shipments of fresh cherries come from San Joaquin County and half from Santa Clara County. (This refers to originating shipping points not to location of production; some early shipments from San Joaquin County include cherries grown outside that county). In occasional years ship-

ments are made from shipping points in other counties. For example, annual rail shipments since 1945 averaged 715 cars: 362 and 352 came from San Joaquin and Santa Clara county shipping points, respectively, and 1 car from points in other counties.

Shipments from the two principal counties differ in seasonal movement. About 20 to 25 per cent of the cherries from San Joaquin County are shipped by May 20, two-thirds during the next three weeks, and 10 per cent after June 10. Shipments from Santa Clara County follow a similar pattern but are made about 10 days later: 20 to 25 per cent in May, two-thirds during June 1–20, and 10 per cent after June 20. Usually, San Joaquin County accounts for 90 per cent of California's shipments made in May 1–20, 65 per cent in May 21–31, 50 per cent in June 1–10, and 15 per cent in June 11–30. Thus shipments from both counties are substantial only during late May and early June. This comparison in shipping seasons is shown in figure 9 for 1955–59.

California ships 35 per cent of its cherries in May, another 50 per cent during June 1–15 and 15 per cent after June 15. No cherries are shipped from other states in May and only 10 per cent of the seasonal movement is marketed by June 15. Hence during May 1–June 15 almost 600 cars come from California and about 125 cars from other states—chiefly Washington, Oregon, and Utah. After mid-June shipments from California are small in relation to those from other states—about 100 cars compared to almost 1,100. Thus, California, which ships only 35 per cent of the cherries sold fresh in the United States, markets almost all of its supply before shipments from other areas become large.

The seasonal pattern of cherry shipments for 1955–59 is shown in figure 10. These data are on a monthly basis be-

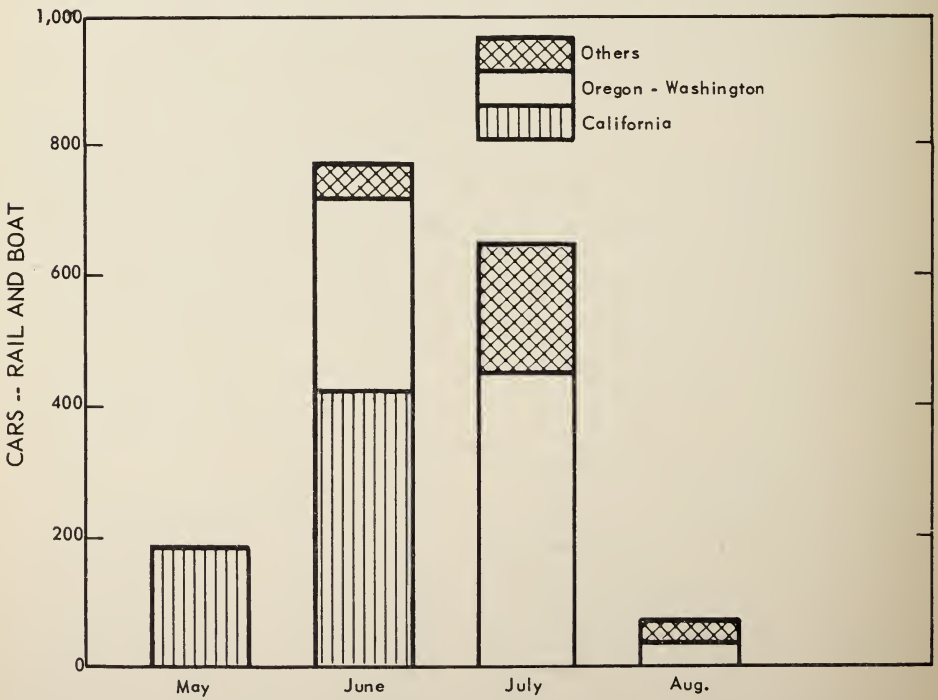


Fig. 10. Sweet Cherries: Monthly Carlot Shipments, by State, 1955–1959 Average.

Table 9. Rail Carlot Shipments of Certain California Fruits, 1950–59

Commodity	1950–54 average				1955–59 average			
	May	June	July	Season*	May	June	July	Season*
Cherries	302	471	0	773	191	416	0	607
Apricots	20	434	95	549	22	223	46	291
Plums	80	1,517	1,328	3,742	124	1,386	1,406	3,692
Other deciduous	12	357	3,850	9,940	39	611	3,190	8,610
Total deciduous tree fruits	414	2,779	5,273	15,004	376	2,636	4,642	13,200
Strawberries	666	286	207	1,435	996	712	483	2,675
Melons	1,010	4,118	4,978	20,840	426	2,707	5,924	18,920
Grapes	20	630	1,716	27,657	60	660	1,895	24,960
Total above	2,110	7,813	12,174	64,936	1,858	6,715	12,944	59,755

* Includes months after July.

cause shipments from most states are not reported for shorter periods.

California cherries are also marketed before most other deciduous fruits are shipped. This means that cherries arrive at consumer markets while the supply of competing fruits is far below the quantity available in the next two months. Monthly rail shipments of cherries and other California fruits, 1950–59 averages, are summarized in table 9.

The relative earliness of the cherry season is apparent. Although cherries constitute only 5 per cent of the deciduous tree fruits shipped from California, they account for 60 per cent of the volume moved in May, one-third of the shipments during the first ten days of June, and 10 per cent of the total in June 11–30.

Auction Marketings

Data on auction sales and prices are not published for cherries in as much detail as for several other fresh fruits. The available information, however, does provide a description of auction marketings and an indication of changes which have taken place.

Table 10 summarizes sales at the New York auction market for 1935–37 and for 1955–59. The data for the later period include two years (1958 and 1959) when shipments were small because production was low. Nevertheless, these auction sales represent a large portion of out-of-state shipments and give a fairly satisfactory indication of the varietal composition of sales.

Sales at one market, the New York Auction, represented 55 per cent of the fresh cherries shipped from California in 1935–37 and 31 per cent in 1955–59. The importance of auction marketings, relative to private sales, decreased during the past quarter century, as it did for other California fruits. For example, since 1935–39 sales at all auction markets decreased from 80 to 66 per cent of apricot shipments and from 68 to 47 per cent of plum shipments.

The varietal composition of auction marketings changed markedly since 1935–37. Relative sales increased for two varieties: Bing from 41 to 64 per cent and Lambert from a small volume to 6 per cent of the total. Black Tartarian declined from 37 to 25 per cent. Other varieties decreased even more—from 22 to 4.5 per cent of auction sales.

Table 10. New York Auction Sales of California Cherries, 1935–37 and 1955–59

Variety	1935–37 average		1955–59 average	
	1,000 pounds	Per cent	1,000 pounds	Per cent
Bing	2,640	41.1	2,900	64.0
Black Tartarian	2,355	36.8	1,145	25.3
Republican	640	10.0	45	1.0
Chapman	245	3.8	90	2.0
Royal Ann	85	1.3	2	†
Lambert	*	...	285	6.2
Other varieties	445	7.0	68	1.5
All	6,410	100.0	4,535	100.0
Other sales	5,190		9,865	
Interstate shipments	11,600		14,400	

* Lambert sales included with other varieties in 1935-37 since they were considerably less in these years than sales for any listed variety.
† Less than 0.05 per cent.

Most California cherries are marketed during a period of five weeks. Usually sales at eastern markets are small until mid-May, reach a peak on about June 10 and decline rapidly within another week. One-half the total is sold during the first two weeks of June and 85 per cent between May 25 and June 25.

Figure 11 shows the distribution of weekly sales for 1955–59. It indicates

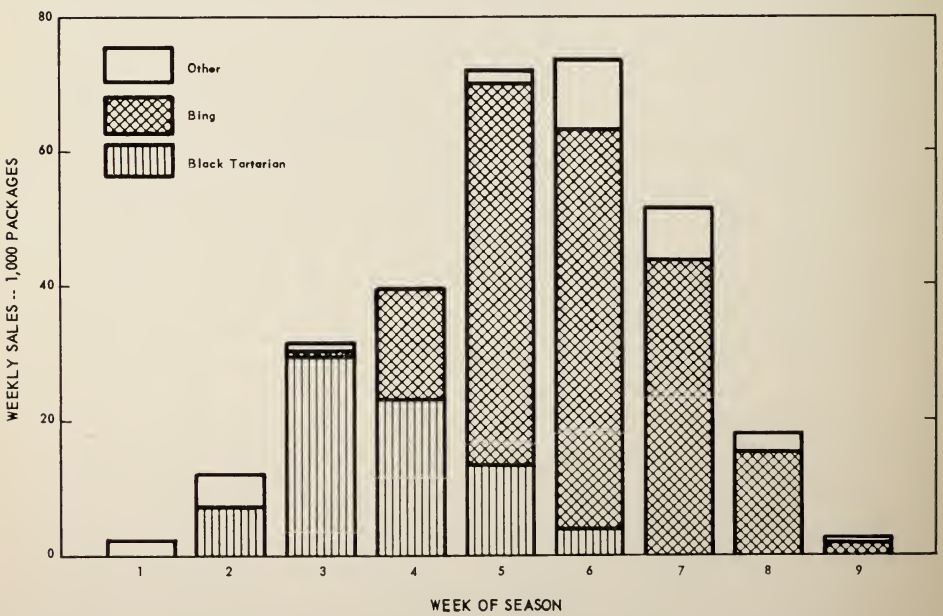


Fig. 11. California Cherries: Weekly New York Auction Sales, by Variety, 1955–1959 Average.

the extent to which the major varieties are sold at different periods. These varieties reach maximum sales at terminal markets in a series of peaks, in accordance with progressively later maturity dates.

Chapman and other early varieties are sold within two weeks or so. Practically all of these cherries are sold by May 20 before other varieties become available in volume. Black Tartarian, the second major variety to come onto the market, is available in large volume by May 20, reaches its peak movement a week later (during the third week of the season), and is practically off the market by June 10.

Sales of Bing cherries begin about the fourth week of the season, the end of May, while Black Tartarian is still in heavy supply. Bing dominates the cherry market during June 5–25, when 80 to 85

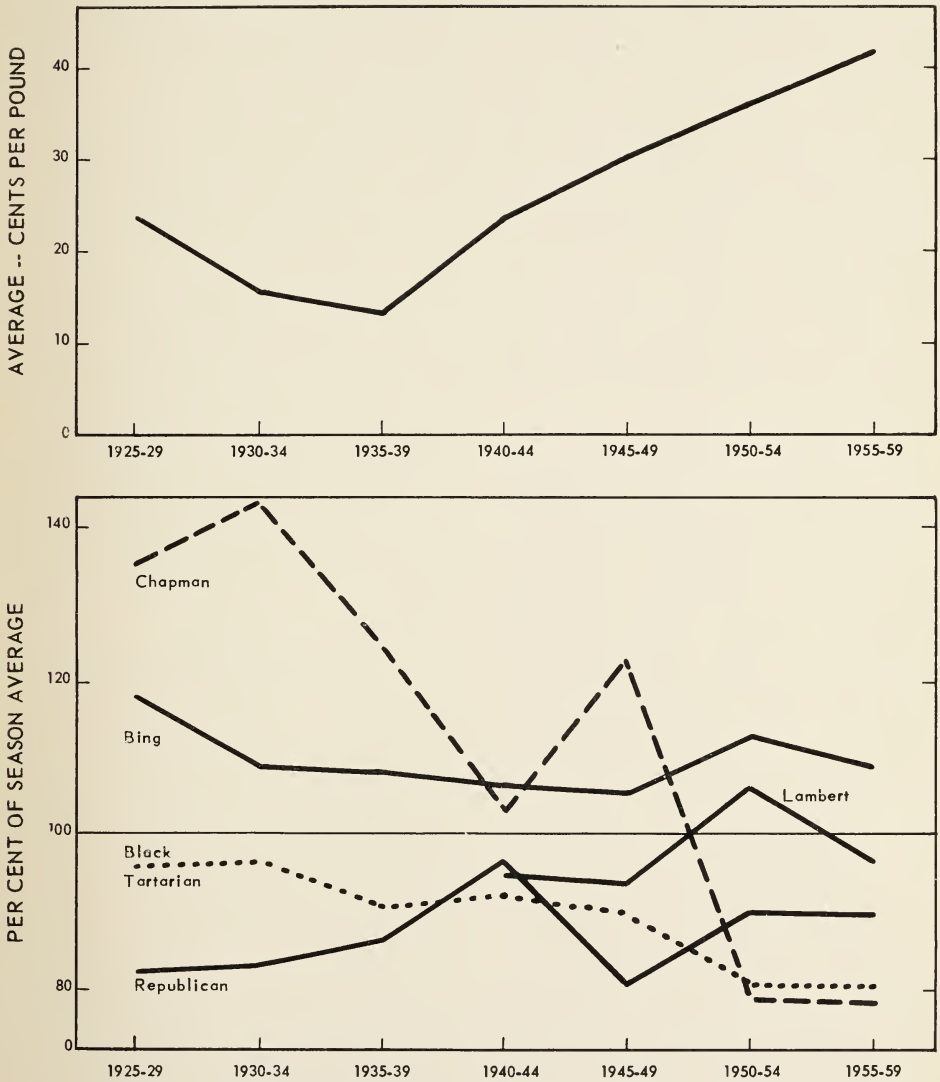


Fig. 12. California Cherries: New York Auction Prices, 1925–1959.

per cent of the season's movement of this variety is sold. During these three weeks Bing represents over 80 per cent of California's cherry sales. After about June 20 (week 6), when Bing sales decline rapidly from their peak, other California cherries, especially Lambert, are marketed, and sweet cherries from Oregon and Washington begin to arrive in large volume.

Auction Prices

Terminal market prices for each variety decline sharply for about three weeks, as sales increase in volume, and then level off. There is a definite tendency for each succeeding major variety to sell at a higher price than the variety going off the market. Thus, as soon as Black Tartarian begins to move in volume during the second or third week of the season, this variety brings a substantially higher price than Chapman then being marketed. Again, two weeks later Bing brings a higher price than Black Tartarian or other varieties sold at that time.

This pattern indicates the usual changes in weekly price for California cherries sold at eastern markets. Prices begin at a high level and fall rapidly for about a month as supplies increase. Then they remain fairly stable for another month or so because varieties of higher quality, such as Bing, constitute a larger proportion of the supply. Finally as the season for California cherries draws to a close, prices may decline again because of increased shipments of cherries from other states and of heavy supplies of other fruits competing with the cherries on the markets.

New York auction prices for the period since 1925 are shown in figure 12 by five-year averages. The average for all varieties decreased from 24 cents per pound in 1925–29 to 14 cents in 1935–39 and then increased (by about 1.4 cents per year) to 42 cents in 1955–59 (see top panel of figure 12).

In comparing relative prices (lower panel of figure 12) it is well to disregard the 1940–44 period since relationships were distorted by war conditions. Relative prices remained fairly stable for two varieties. Bing sold at a premium of about 10 per cent during most of the period since 1925 and Republican at a discount of 15 per cent. Lambert prices, available only since 1940, rose from 95 to 103 per cent of the average. Relative prices declined for the other two varieties—from 140 per cent of the average in 1925–34 to 78 per cent in 1950–59 for Chapman and from 96 to 81 per cent for Black Tartarian.

Changes in relative prices alone do not explain shifts in sales since usually they are in the same direction—e.g., both relative prices and sales have increased for Lambert and decreased for Chapman. This situation is explained by consumer preferences for particular varieties. Eastern buyers are unwilling to buy Chapman and Black Tartarian except at prices which become lower and lower relative to prices for other California cherries. They are willing, on the other hand, to buy greater quantities of Bing and Lambert at the same or higher relative prices. Relative prices for Republican were maintained only by a sharp reduction in sales.

GROWER RETURNS

Farm price, as reported by the California Crop and Livestock Reporting Service, refers to the payment received by producers for "naked fruit at the first delivery point." Such prices are available for each year since 1919 for the cherries sold in each major utilization outlet and for "all uses." Other meanings for farm price are sometimes used: for fruit on the tree, for fruit delivered by a grower to the packing house or processing plant, for fruit sold by him to a wholesaler or retailer, etc.

General Level

Changes in consumer purchasing power and in farm production are the main reasons for fluctuations in farm prices for cherries. Consumer purchasing power is particularly important in setting the general movement of prices. Production changes also affect this long-run trend, but are more influential in explaining variations in annual prices.

Farm prices have varied widely during the past 40 years. They were at a record low of $60 per ton in 1932, at the depth of the depression. A peak of $461 was reached in 1959, when consumer purchasing power was high and a very small crop was produced.

Average farm prices dropped steeply from $175 per ton in 1926–29 to $63 in 1932–33. They increased gradually over the next decade to $139 in 1940–42 and then jumped to $236 for the war period, 1943–46. Because production has varied so sharply during the past few years, it is difficult to indicate the level toward which the price movement has been tending. But it appears that the upward trend prevailing during the immediate postwar years is continuing. The average price of $342 received in 1955–59 may be a little above the level expected because production was very small in 1958 and 1959.

Year-to-year price changes have been large for cherries, as for most other fruits. For example, since 1940 (when the price averaged $276 per ton) the price changed from one season to the next by more than $120 in four years, by $50 to $90 in seven other years, and by less than $40 in nine.

Table 11. Yield and Grower Returns for California Cherries

Year	Yield	Grower returns	
		Per ton	Per acre
	Tons per acre	Dollars	
1945	3.1	282	880
1946	2.8	304	863
1947	2.5	251	629
1948	2.2	326	733
1949	4.4	182	808
1950	3.3	272	896
1951	2.1	361	754
1952	4.1	221	915
1953	2.8	299	851
1954	2.5	336	855
1955	3.6	267	972
1956	3.7	287	1,050
1957	3.2	285	935
1958	1.3	415	531
1959	1.4	454	617
Average	2.87	302.80	819.30
Average change*	.91	70.57	120.64
Ratio (per cent)†	31.6	23.3	14.7

* Average of changes from one year to the next.
† Average annual change divided by average for 1945–49, expressed as a percentage figure. This result is approximately equal to the statistician's coefficient of variation.

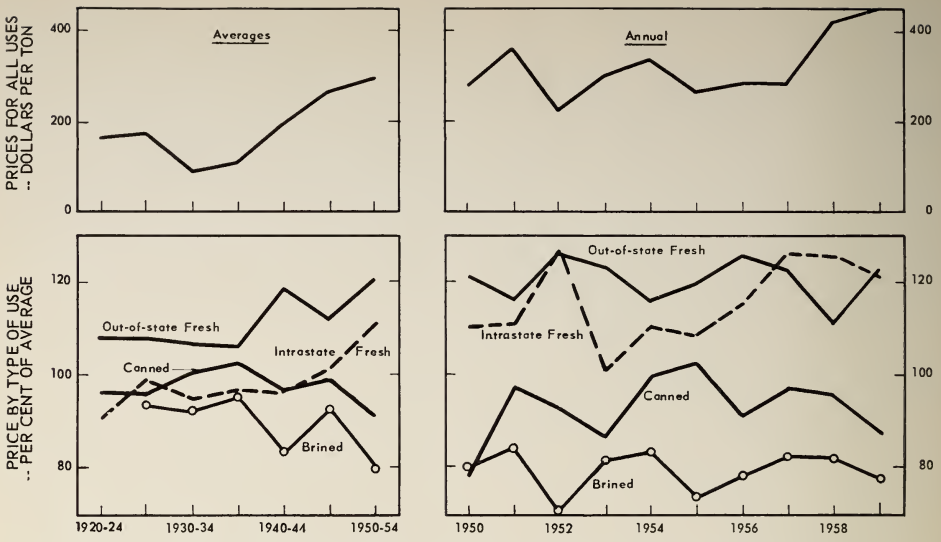


FIG. 13. CALIFORNIA CHERRIES: GROWER PRICES BY TYPE OF UTILIZATION, 1920–1959.

These price fluctuations are highly correlated inversely with changes in annual production. (In statistical terms, the correlation coefficient is $r = -0.81$. This result indicates that for 1940–59 about two-thirds, r^2, of the year-to-year changes in farm prices are explainable by annual fluctuations in production.)

Yield, as well as per-ton price, is important in determining the farmers' gross income, from which production and harvest costs must be paid. Generally, prices are higher when yield is low and lower when yield is high. For example, during 1945–59 (see table 11) there is a pronounced inverse relationship between price and yield. (Statistically, the correlation coefficient is $r = -0.91$.) Because of this correlation, equivalent per-acre returns fluctuate less than prices. During 1945–59 per-acre returns varied (about their average level) only 63 per cent as much as farm prices.

This does not mean, however, that the price will necessarily increase sufficiently when yield is low, to maintain per-acre returns. Since 1945, the price was high in five years (1948, 1951, 1954, 1958, and 1959)—an average of $378 per ton or 43 per cent above the average ($265) for the other ten years. Per-acre returns for these five years averaged one-fifth less ($698 compared to $880) because yield was so much lower—1.90 tons per bearing acre, compared to 3.38 tons.

A reduction in per-acre return, caused by lower yield, must be compared with the "saving" in harvesting costs. For the five years under consideration the grower would have come out equally well if his harvest costs averaged $123 per ton. He would have been better off if these costs were higher, and worse off if they were lower.

Returns by Outlets

The relationship among prices for cherries entering different outlets, for the period since 1920, is shown in figure 13. Generally, farm prices were higher for fresh cherries than for those processed. The difference became more pronounced during the past 20 years. Relative prices increased for fresh cherries (from 3 per cent above the average for all sales in 1920–39 to 18 per cent in 1950–59) and

declined for brining cherries (from 93 to 79 per cent of the average). They increased and then decreased for cannery cherries. In other words, since 1950 brining and canning cherries sold at 67 and 78 per cent, respectively, of the farm price for fresh cherries, compared to averages of 90 and 96 per cent during 1925–39.

Future Returns

Farm prices, as noted, depend largely on the level of production and consumer buying power. An increase in production during the next few years is expected largely because of expanded bearing acreage (see page 12). The future course of consumer purchasing power, however, cannot be estimated with the same degree of confidence.

If production expands in the manner indicated in this circular, the increased supply of cherries will tend to depress prices. There is no reason for expecting a decrease in shipments of competing fruits. A decline in prices will be checked, at least in part, as long as the American economy continues to grow at or near the recent rate.

Farm prices may continue their present upward trend, if production increases less rapidly than anticipated or declines, if consumer purchasing power expands at a rate above that prevailing recently, and if consumers change their buying habits and want more cherries at higher prices. Since these situations are not likely to materialize, cherry prices are not expected to continue their present upward trend.

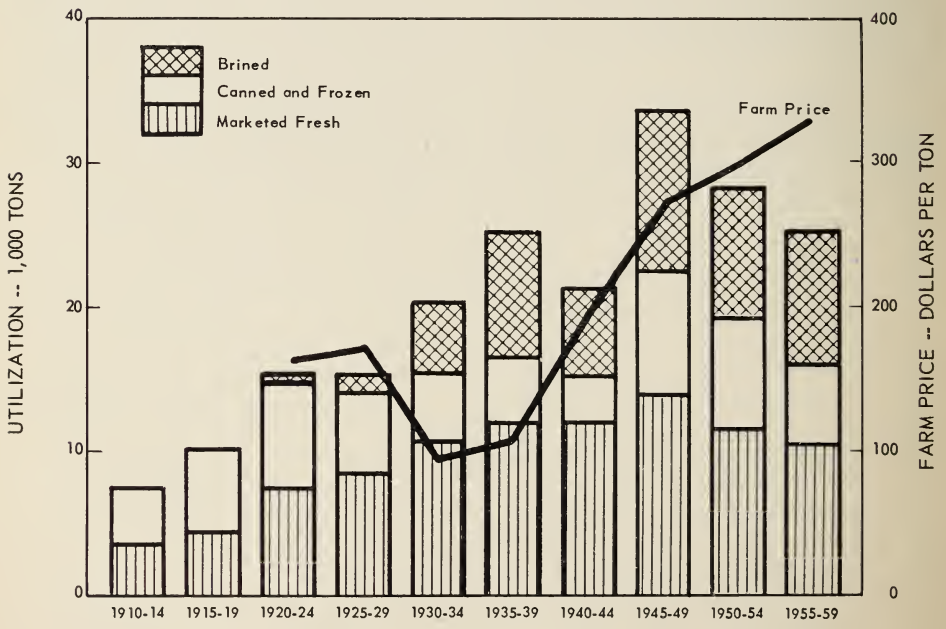
In occasional years, when bumper crops are produced, farm prices will decline sharply, as they have in the past. Price relationships among the different outlets should remain about the same since the utilization pattern is not expected to change much.

The tables and charts used in this circular are summaries of more detailed information appearing in "Mimeographed Report 224," published December 1959. This report gives sources in detail and may be obtained by writing to the Giannini Foundation of Agricultural Economics, University of California at Berkeley or at Davis.

Data for table 10 and charts 11 and 12 are based, in part, on unpublished material made available to the author by the California Federal-State Market News Service.

In brief . . .

California cherry production during the past 50 years reached an all-time high immediately after the war, has declined since. Fresh sales have roughly followed the same pattern, canning dominated the processed-cherries market until 1924 when brining was introduced; today more California cherries are brined than canned. Farm prices have been rising since the mid-thirties. The chart below gives a summary presentation of the past trends.



Co-operative Extension work in Agriculture and Home Economics, College of Agriculture, University of California, and United States Department of Agriculture co-operating. Distributed in furtherance of the Acts of Congress of May 8, and June 30, 1914. George B. Alcorn, Director, California Agricultural Extension Service.

6½m-8,'61(C520)J.F.

Consider YOUR Future in Agricultural Economics

Agricultural economics applies SCIENCE to the BUSINESS OF FARMING . . . to the marketing of farm products, to the use of agricultural and range resources.

If agriculture is to continue as an important segment of our national economy, farmers must be adequately trained in the business of farming. The University of California's course of study in agricultural economics is a step toward that goal.

The curriculum . . . presented on the Davis campus, places major emphasis on Farm Management . . . but also provides instruction in Marketing, Co-operative Marketing, Agricultural Finance, Policy, and related subjects. Supplementary work may also be taken in such branches of agriculture as Agronomy, Animal Husbandry, Pomology, Agricultural Engineering, and the like.

The faculty . . . is comprised of trained, experienced economists, many with national and international reputations in their fields. The staff is active in service and research work in all of the Western States.

Job opportunities . . . can best be understood by pointing to positions now occupied by graduates. The largest percentage are farmers. Other lines of endeavor include:

Farm Managers • Credit work • Farmer Organizations
Marketing Organizations • Agricultural Extension work
State and Federal Departments of Agriculture work
College teaching and research • High school teaching

For more information: Write to the Department of Agricultural Economics, University of California, Davis.

or: See your University of California Farm Advisor for college entrance requirements.